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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/883,190	06/19/2001	Sunil K. Jain	219.39488X00	9925

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EXAMINER
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TRIMMINGS, JOHN P

ART UNIT	PAPER NUMBER
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2133

DATE MAILED: 08/27/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/883,190

Applicant(s)

JAIN ET AL.

Examiner

John P Trimmings

Art Unit

2133

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-41 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-41 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 6/19/2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

### **DETAILED ACTION**

Claims 1 – 41 are presented for examination.

#### ***Drawings***

Applicant is required to submit a proposed drawing correction in reply to this Office action. However, formal correction of the noted defect may be deferred until after the examiner has considered the proposed drawing correction. Failure to timely submit the proposed drawing correction will result in the abandonment of the application.

The drawings are objected to because Figure 6 requires a minor modification; the step in the first column, which reads "PROCESS ANALOG DATA", most likely should be boxed in the same manner as are all of the other steps. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the comparison unit, first evaluation unit, and second evaluation unit referenced in claim 14 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

#### ***Specification***

The disclosure is objected to because of the following informalities:

- a. Paragraph [0003], line 7 states "tester driver 104"; but the examiner believes it should state "tester driver 102".
- b. Paragraph [0004], line 2 states "104 and the..."; but the examiner believes it should state "103 and the...".
- c. Paragraph [0025], line 11 states "... so to optimize..."; but the examiner believes it should state "... so as to optimize...".
- d. Paragraph [0025], line 18 states "determined in step 35"; but the examiner believes it should state "determined in step 36".

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 8 – 13 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter, which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The specification describes the use of a differential oscilloscope that monitors the DUT applied signal and the DUT output signal, and provides some sort of input/output exchange to the processor (see FIG. 3). The

oscilloscope in FIG. 3 appears to be an integral part of the analog and complex waveform analysis proposed in the specifications, and there appears to be no other path, according to FIG. 3, to measure these signals. But the oscilloscope in the drawing has no apparent relationship to the processing of analog data in the application (claims 8 – 13). In other words, claims 8 – 13 are not dependent on a claim of a differential oscilloscope (claim number 7). It is not clear to one having ordinary skill in the art exactly how these claims are enabled, since the oscilloscope is not used as the monitoring device. The claims 8 - 13 do not clearly show a method to obtain rise-times, fall-times, ranges of these times, and the various eye diagrams described.

Claims 24 - 27 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter, which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The specification describes the use of a differential oscilloscope that monitors the DUT applied signal and the DUT output signal, and provides some sort of input/output exchange to the processor (see FIG. 3). The oscilloscope in FIG. 3 appears to be an integral part of the analog and complex waveform analysis proposed in the specifications, and there appears to be no other path, according to FIG. 3, to measure these signals. But the oscilloscope in the drawing has no apparent relationship to the processing of analog data in claims 24 - 27. In other words, claims 24 - 27 are not dependent on a claim of a differential oscilloscope. In fact, there was no claim made for an oscilloscope in the apparatus. It is not clear to one

having ordinary skill in the art exactly how these claims are enabled, since the oscilloscope is not used as the monitoring device. The claims 24 - 27 do not clearly show a method to obtain rise-times, fall-times, ranges of these times, and the various eye diagrams described.

Claim 41 is rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential structural cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections. See MPEP § 2172.01. The omitted structural cooperative relationships are: Claim 41 is drawing a dependent relationship of a virtual differential oscilloscope to claim 27, 26, and 18, the tree of which defines a physical article. This virtual-to-physical relationship in this claim does not have any linkage that would connect the two concepts together.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 2, 3, 4 and 14, 15, 16, 17 and 18, 19, 20, 21 are rejected under 35 U.S.C. 102(b) as being fully anticipated by Reiner Gohringer, U.S. Patent 5909186. Gohringer teaches the claimed apparatus, software system, and method of applying a signal to an analog, mixed signal, or digital device, a differential and integral

measurement unit for monitoring the output from the device, comparing and evaluating the output, then feeding analog data back for processing digital setups and feeding digital data back for processing analog setups, and upon adjustment of the setups, returning to re-apply a new signal. During this full testing cycle, the device would be determined to be good or bad.

As per claims 1, 14, and 18; Gohringer teaches a method, system, and apparatus for a tester with digital in/out and analog in/out nodes for applying and monitoring signals. "A digital tester interface for testing a device having a digital input node and an analog output node..." as per Gohringer claim 1, "A digital tester interface for testing a device having an analog input node and a digital output node..." as per Gohringer claim 4. A "digital comparator" and "an analog to digital converter" (Gohringer claim 18) for processing both data types, processing "at least one of a differential linearity error" (Gohringer claim 17), evaluating the data, "to compute at least one performance parameter...based upon digital signal values" (Gohringer claim 18), and evaluating the device, "...testing a device..." as in Gohringer claim 1.

As per claims 2, 15, and 19; Gohringer teaches a method, system, and apparatus wherein analog data feeds back for use in processing digital inputs, and digital data feeds back for use in processing analog inputs. In his claim 4, he takes a digital counter based on an digital signal received from the DUT, converts it to analog value, and applies the analog signal to the analog input of the DUT. In claim 15 he takes a digital value based on an analog signal received from the DUT, and applies the digital value which has been modified, to the digital input of the DUT.

As per claims 3, 4, 16, 17, 20, and 21, Gohringer compares and evaluates the outputs from the DUT and re-iterates the test process with different input values until testing is stopped by an error or reaching a predetermined value. Gohringer claim 15 teaches this by claiming the following steps: (1) providing a signal, (2) performing test operation, (3) converting DUT output, (4) incrementing count until equal, (5) evaluating DUT, (6) repeating all until error.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation



under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 28 – 31, 33, 34, 36, and 37 - 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sauer et al., U.S. Patent No. 5951704, in view of Andrew Grochowski et al., Integrated Circuit Testing for Quality Assurance in Manufacturing: History, Current Status, and Future Trends, 1997, IEEE Transactions on Circuits and Systems-II: Analog and Digital Signal Processing, Vol. 44, No. 8, August 1997.

As per all of the above mentioned claims, Sauer et al. substantially teaches a method and a system for programming an emulator, which encompasses virtual hardware to generate test signals, a virtual device attached to the virtual test head, and a device emulator which outputs to an emulated comparator. The result is a totally virtual test system for developing the present tester protocol and changes thereof, tester hardware changes, device design and modification, all without using the hardware of the test system (column 9, lines 42 – 53, and column 10, lines 4 – 67). Not explicitly disclosed is the use of a general-purpose computer in the Sauer et al. invention, as claimed in this application.

However, in an analogous art, Grochowski et al., is quoted in the publication as follows; "Computer models that emulate the ATE are being developed to be incorporated into the same CAD tools used during the design phase. This will allow the test engineer to exercise the model for DUT (i.e., SPICE or HDL) within an emulated

test environment.” (page 619 line 6). This statement specifically points to a general-purpose computer driven system. Therefore, it would have been obvious to a person having ordinary skill in the art at the time this invention was made to use a general-purpose computer. Tester processors are a form of general-purpose computer and are programmed as such, and the tester processor in Sauer et al. could have been substituted by a general-purpose computer in order to perform any and all functions of the tester. One would have been motivated to use a general-purpose computer to drive a tester because of the obvious savings in employing a less expensive general-purpose computer. And therefore, as suggested in Grochowski above, and applied in Sauer (column 9, lines 42 – 53), a general-purpose computer would have been obvious.

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Reiner Gohringer, U.S. Patent 5909186 as applied to claim 7 above, and further in view of G. Cauffet et al., Digital Oscilloscope Measurements in High Frequency Power Electronics, IEEE, reference 0-7803-0640-6/92, pages 445 - 447. Whereas Gohringer teaches the tester using standard tester measurement hardware, Cauffet et al. explicitly discloses “associating a digital oscilloscope for acquisition, to a work station for control, corrections, mathematical processing, and presentation” (paragraph 3), in measurements of high frequency power electronics. One having ordinary skill in the art at the time the invention was made would have deduced that digital oscilloscopes, when attached to a work station would provide many complex measurements other than the standard measurements afforded by the tester itself. Therefore, one would have

attached a digital oscilloscope to the tester in order to acquire critical, complex waveform measurements.

Claims 32 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sauer et al., U.S. Patent No. 5951704 as applied to claims 32 and 35 above, and in view of G. Cauffet et al., Digital Oscilloscope Measurements in High Frequency Power Electronics, IEEE, reference 0-7803-0640-6/92, pages 445 - 447. Whereas Sauer et al. teaches the emulator using standard tester measurement hardware, Cauffet et al. explicitly discloses "associating a digital oscilloscope for acquisition, to a work station for control, corrections, mathematical processing, and presentation" (page 445, paragraph 3), in measurements of high frequency power electronics. One having ordinary skill in the art at the time the invention was made would have deduced that oscilloscopes when attached to a work station would provide many complex measurements other than the standard measurements afforded by the tester itself. Since the claims 32 and 35 refer to "virtual oscilloscopes", and Cauffet et al. refers to the real world, it would be obvious to use a "virtual oscilloscope" attached to a virtual system as described in claims 32 and 35.

Claims 5, 6, 22, and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Reiner Gohringer, U.S. Patent No. 5909186, as applied to claims 5, 6, 22, and 23 above, and further in view of Sauer et al. U.S. Patent 5951704. Wherein Gohringer teaches a mixed signal tester, with applied signals that can be varied through a feedback loop with the monitoring unit, he does not teach varying frequency and level of the input signals to the DUT as in above claims 5, 6, 22, and 23. However, Sauer et

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al. further teaches, "...various parameters are specified such as frequency, waveform, delay time and amplitude of the test signal to be applied to each terminal of the semiconductor device..." A person skilled in the art would be motivated to combine both references above, varying frequency and level of input signals among others, to effectively test a device.

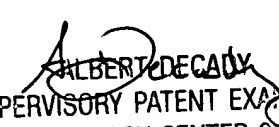
### ***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Foreman et al., U.S. Patent No. 4044244.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John P Trimmings whose telephone number is 703-305-0714. The examiner can normally be reached on 8 x 5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Albert DeCady can be reached on 703-305-9595. The fax phone numbers for the organization where this application or proceeding is assigned are 703-746-7239 for regular communications and 703-746-7238 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-2394.

John P Trimmings  
Examiner  
Art Unit 2133  
  
ALBERT DECADY  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2100

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August 20, 2003